

# The Teacher's Knowledge/Doing About Active methodologies for meaningful Learning in Higher Education: An Integrative Review

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**Keywords—** Active learning methodologies. Meaningful Learning. Higher education.

**Abstract—** Objective: Map the scientific evidence about the knowledge and actions of university professors about active methodologies and describe the perception and opinion about the modes of organization, methodological approaches and evaluation systems that define the teaching-learning process. Method: This is an integrative literature review, in which 11 articles were selected from the Google Scholar, SciELO and PubMed databases, by fulfilling the requirements established in the eligibility criteria and answering the research question. Results: The findings were categorized into 1) Benefits of applying active methodologies in higher education; 2) Knowledge of professors working in higher education about active methodologies; 3) Practices of active faculty in higher education on active methodology. Final Considerations: Promoting active learning is not an easy task to be achieved and teachers play a fundamental role in its implementation process.

## I. INTRODUCTION

Teaching and learning practices in higher education are undergoing a series of changes that have significant implications for the nature of students' learning experience. The traditional approach to teaching in Brazil, as in many parts of the world, involved the unilateral transmission from teacher to students. In higher education, appeals have been made for active learning experiences that place the student at the center of learning, rather than accepting students as passive listeners. [1]

Generally speaking, a teaching situation corresponds to the moment when one person intentionally helps another to learn something. However, individual knowledge is not a concrete and directly observable object, but, above all, a set of mental representations built from the interpretive dynamics that the subject of knowledge establishes with the objects of the world he perceives. Thus, the act of teaching and learning is mediated by different representations of the same knowledge: that of the teacher, that of the student and that of the teaching material. [2]

In the meantime, learning, in this dynamic, corresponds to a continuous, personal, intentional process, as it is up to the student to substantively relate the new information with the relevant ideas existing in their cognitive structure, active (because it requires mental activity), dynamic, recursive, of interaction (between information and prior knowledge) and interactive (because it establishes relationships between subjects), which generates an always provisional product characterized by a particular knowledge produced in a given moment and context. [3]

From this perspective, Meaningful Learning, according to David Ausubel [4], is a promising strategy in a formal teaching situation, which consists of the non-arbitrary and non-literal interaction of new knowledge with relevant prior knowledge. Thus, from successive interactions, the object of knowledge progressively acquires new meanings, becomes richer, more refined, more differentiated and is capable of serving as an anchor for new significant learning.

The central point of reflection in Ausubel's Theory of Meaningful Learning (TML) is that, among all the factors that influence learning, the most important is what the student knows in advance, which is considered the starting point. [5]

In this context, the so-called active teaching methodologies arise, consisting of a change in the learning paradigm and in the relationship between teacher and student. The student then becomes the protagonist of the teaching process, while the educator assumes the role of an advisor, opening space for the interaction and participation of students in the construction of knowledge. [6]

In 2012, the European Space for Higher Education highlighted the importance of students thinking critically as part of genuine student-centred learning, as seen in the curricula of many universities. That critical thinking is a reflective activity that leads to action and that, in order to develop it, students must think about what they think. [7]

Universities should encourage how to think, not what to think. Reading and reflecting from different sources can overcome the lack of experience at graduation. Thinking critically is a process and its acquisition requires time. [8]

In this process, university professors must be aware of the need for a transformation to adapt their teaching methodologies to the learning of their students, as their way of thinking can generate fixed routines in their teaching practices. That is, the teacher must also reflect on their practices and introduce different and varied methodologies. [9]

Thus, the objective of this study is to map the scientific evidence about the knowledge and actions of university professors about active methodologies and to describe the perception and opinion about the modes of organization, methodological approaches and evaluation systems that define the process of teaching-learning.

## II. METHOD

This is an integrative literature review, which includes the analysis of current research results that can support the understanding of the current scenario of active teaching methodologies from the perspective of knowledge (knowing) and practices (doing) of active teachers in higher education.

It can then be said that active methodologies contribute to the development of skills and abilities as they provide students with the role of protagonists in the learning process. Therefore, teaching-learning methods should be valued as essential elements in the construction of training through competences. [10] In this context, the integrative review is a method that provides the integration of knowledge and the applicability of important research results in practice, allowing to gather and summarize several published studies, as well as bringing conclusions about the topic addressed in the study. [11]

Seven steps were used for the development of this integrative review, namely: 1) identification of the theme and selection of the hypothesis or research question for the elaboration of the integrative review; 2) establishment of inclusion and exclusion criteria for studies/sampling or literature search; 3) definition of information to be extracted from selected studies/categorization of studies; 4) evaluation of the studies included in the integrative review; 5) interpretation of results and 6) presentation of the review/synthesis of knowledge. [12]

To answer the objective of the work, the following research question was developed: what has been researched and published in scientific circles in the last ten years, about the knowledge and actions of higher education teachers about active teaching methodologies for a meaningful learning?

The inclusion criteria established were: qualitative or quantitative research, available online, in the format of articles, in English and Portuguese, published in the last ten years (2012 to 2021), which focuses on the analysis of perception and implementation of active methodologies in higher education. Articles not related to the proposed theme, other types of texts such as

dissertations, theses, etc., as well as repeated articles in the consulted databases were excluded.

Initially, 88 articles were found in the Google Scholar (28), SciELO (03) and Pubmed (57) databases, using the keywords "Active methodologies", "Meaningful learning", "Higher education", by use of Boolean operators. After applying the filter "year of publication" and reading the abstracts, 11 articles were selected that met the requirements established in the eligibility criteria and were in accordance with the

objectives proposed by this work.

### III. RESULTS AND DISCUSSION

In this narrative review, 11 original scientific articles were selected that strictly met the previously established criteria for sample selection and showed similarities with the object of study of this research, as shown in Table 1:

Table 1: Distribution of studies.

STUDY	TITLE	AUTHOR/YEAR	OBJECTIVE	MAIN RESULTS
1	Percepção das metodologias ativas por professores que atuam no Estado de Minas Gerais, Brasil.	Nascimento, Mesquita e Vianna (2021).	Evaluate the perception of active methodologies by teachers who work in basic and higher education in the State of Minas Gerais.	Although 79.2% of respondents did not receive training during graduation, most consider their inclusion relevant, reflecting the need to modernize the curricula.
2	Methodologies for teaching-learning critical thinking in higher education: The teacher's view.	Bezanilla <i>et al.</i> (2019).	Review the literature focusing on methodologies used to teach critical thinking in higher education and not on assessment or the concept of critical thinking.	The results seem to indicate that teachers use and consider as most effective mainly three different methodologies: oral and written reflection and argumentation; reading, analysis and synthesis of resources; and case studies, regardless of their concept of critical thinking, although some other trends are observed, such as critical thinking methodologies and concepts.
3	Percepção dos docentes sobre o uso de metodologias ativas de aprendizagem em um curso de sistemas de informação.	Pessoa <i>et al.</i> , (2019).	Conduct a survey with the teachers of the Bachelor of Information System (BSI) course, about the use of active methodologies, how they are applied in the classroom and how assessments intermediated by active methodologies are carried out	The results showed that teachers have difficulties with the application of active methodologies, as well as showing a resistant attitude towards the change to this new teaching model.

4	Metodologias ativas de ensino e aprendizagem: a percepção de professores do Curso de Nutrição de uma Instituição de Ensino Superior na Amazônia Ocidental.	Nogueira (2017).	To investigate the perceptions and practices of teachers about Active Methodologies and their role in the teaching and learning process in a Nutrition Course at a private Higher Education Institution in Porto Velho-RO.	It was noted that some teachers were a little reticent to change, pointing out some difficulties in the use of Active Methodologies in the Nutrition Course of the studied institution, however, in a still quite empirical way, it was noticed that they have performed attempts to use innovative teaching strategies in their classes, despite having declared that they do not have sufficient pedagogical preparation to understand more clearly the elements that involve pedagogical practices and their epistemological bases.
5	Percepção do docente e discente sobre o uso de metodologias ativas de aprendizagem no ensino médico na Universidade São Francisco.	Plantier; Costa e Garcia (2020).	Evaluate the level of perception of professors and students of the Medicine Course at Universidade São Francisco regarding the development of Active Methodologies.	From the evaluations and opinions, it was possible to assess the familiarity of professors and students, the contribution of Active Methodologies in the critical and reflective formation of the student, their role in the development of interdisciplinarity and interpersonal and interprofessional relationships.
6	Teachers' perceptions of aspects affecting seminar learning: a qualitative study.	Spruijt <i>et al.</i> (2013).	Qualitatively explore teachers' opinions on aspects that affect seminary learning.	Teachers identified seven key aspects that affect seminary learning: the seminary teacher, students, preparation, group functioning, seminar objectives and content, course coherence, schedule, and facilities.

7	Faculty and second-year medical student perceptions of active learning in an integrated curriculum.	Tsang e Harris (2016).	To analyze the perceptions of students and teachers about active learning in an integrated medical curriculum in the second year, where students were exposed to multiple educational pedagogies.	Teachers felt that active and collaborative learning was more effective. Teachers felt that lack of curriculum time and preparation time were barriers for the faculty.
8	Behind teaching-learning strategies in physiology: perceptions of students and teachers of Brazilian medical courses.	Nasre-Nasser <i>et al.</i> (2021).	To analyze the perceptions of medical students and professors about the teaching-learning strategies used in physiology in different Brazilian universities, as well as the factors that influence or hinder the learning of this discipline.	Some factors that hinder the teaching-learning process of physiology were identified by the respondents, such as: large amount of information, little time for study outside the classroom, prior knowledge and intrinsic difficulty in the discipline.
9	Metodologias ativas no ensino superior: percepção de docentes em uma instituição privada do Distrito Federal.	Azevedo, Pacheco e Santos (2019).	Map the perception of professors at a private college about the use of these methodologies.	The results show that 96% of the participants use active methodologies in their teaching practice.
10	Perception of health-related case studies in the context of introduction to clinical medicine course: students' and teachers' perspective.	Jovanovic <i>et al.</i> , (2020).	To examine the effect of the presentation of clinical cases on short-term memory, as well as on the evaluation of students and professors of this method of teaching and learning in undergraduate medicine.	The presentation of clinical cases has learning potential and facilitates positive interaction between instructors and students and helps students to become reflective and competent physicians.
11	Experiences of medical teachers in flipped learning for medical students: a phenomenological study.	Park; Park e Chae (2018).	Explore the experience of medical professors in the process of adapting the inverted learning method through a phenomenological approach.	Although medical professors did not have quite the same idea about how inverted learning was conducted and implemented, the perception of inverted learning, or difficulties in classroom activities, they were still wondering how they could teach students well. This study can draw more attention to inverted learning and encourage

				educational and institutional supports to improve teaching and learning in medical schools.
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From the analysis of the selected articles, the findings were categorized into: 1) Benefits of applying active methodologies in higher education; 2) Knowledge of professors working in higher education about active methodologies; 3) Practices of active faculty in higher education on active methodology, for better presentation and understanding of results.

### **Benefits of applying active methodologies in higher education**

It was found that active methodologies bring direct benefits to students, as they allow the development of their autonomy, thus forming creative, reflective and independent professionals who use the acquired knowledge in a holistic way, minimizing the occurrence of fragmented training. [13]

The implementation of active instruction strategies requires changes in the teacher's logic within the classroom environment. Unlike traditional education that pre-defines the important themes in an organized, systematic and coherent way, so that students can learn; active learning requires that teachers first establish the goals to be achieved and choose one or more appropriate teaching strategies to achieve those goals. [14]

Regarding the use of active methodologies, the results found highlight that they encourage interdisciplinarity, investigation and promote the development of learning tools, as well as group work and student learning. [15]

Similar results, highlighting that the use of active methods promotes students' analysis and reflection, helping students to play an active role in the acquisition of knowledge. The main difficulty in implementing these methods is the high number of students per class, which does not facilitate the development of active methodologies. [16]

### **Knowledge of professors working in higher education about active methodologies**

A study proposed to assess the perception of active methodologies by teachers who worked in primary and higher education and the results showed that regarding the knowledge of active methodologies, 82.1% of the teachers knew some methodology, being more familiar with: seminar (57.2%), project/problem-based learning (51%) and inverted classroom (45.7%). Only 20.8% were trained during graduation and only 23.3% received training from

the institution where they work. [17]

The responsibility for curriculum design and development belongs exclusively to the teacher, including the way in which instruction is organized, the choice of content and the teaching methods and assessment procedures. The same is true for knowledge transformation. In this case, reproduction as a product of learning is sought.[18] This model does not seek student involvement in knowledge construction or decision-making about how this knowledge is about student learning, and focuses on competence rather than cooperation, with minimal and unilateral interaction between student and teacher. [15]

Instructions will only occasionally be bidirectional, in order to keep students' attention or ensure understanding of the content covered in order to resolve queries. Typically, these lessons are based on explanation, using lectures, student notes, and memorization so that students can repeat the knowledge later. Students are usually assessed by the traditional exam, the learning-centered model, instead, emphasizes student learning. Knowledge is understood as a personal construction, the result of cooperation between teacher and students. The product of learning must be the exchange of knowledge. [15]

Although the teacher is responsible for curriculum design, this model requires joint work by the teacher and their peers, as well as cooperation with students, of the many broad definitions of active learning, all of which basically involve something more than listen passively. The active participation of the student presupposes the implementation of active methodologies with repercussions both on the educational process and on the mechanisms for evaluating the degree and quality of the acquired learning. [19]

The presence of active methods in university classrooms will be effective as long as the teacher takes into account the student's participation in the organization and proposition of teaching and learning methodologies, as well as assessment methods. In this sense, the better the activity, the greater will be the participation and understanding of students about the content to be learned. Therefore, the teacher must encourage students to seek information, discuss ideas with colleagues, develop new approaches to solving problems and constantly question their own level of understanding. [20]

However, most university professors have little or no preparation for active teaching. Furthermore, active learning instruction is fundamentally different from the traditional lecture approach that most college professors have experienced as students. [21]

### **Practices of professors working in higher education on active methodologies**

The teacher needs to think about the educational process to structure it. However, these professionals generally start their careers as educators, without pedagogical training for teaching, despite having skills in the specialty. [22]

Therefore, the teaching action has been based on the experience of their training process, being a mirror of the teachers themselves, who taught their classes in traditional teaching modalities. [14]

The traditional teaching model gives special importance to the figure of the teacher, in this model, the teacher is the one who knows, and it is their responsibility to transmit this knowledge well, with students having the sole task of reproducing knowledge. [23]

This scenario is consistent with a practice in which teachers teach their classes according to their convictions and repeat models experienced during their training. However, the training of a teacher cannot be restricted to participation in specific courses, and must necessarily include training, supervision and assessment programs that are carried out in an integrated and permanent manner. [9]

A study found that 51.6% of teachers do not receive encouragement to use the methodologies and report as main challenges the lack of training (68%), planning time (48.5%), lack of material (48.5%), application time (42.7%) and student participation (40.2%). Although 79.2% of the research professors did not receive training during their graduation, most consider the inclusion of active methodologies relevant, reflecting the need to modernize the curricula. [17]

Study research that, in the perception of teachers, the main barrier was the lack of time in the curriculum for active learning. [6] Corroborating this, other study concluded that teachers believe they do not have enough time to implement active methodologies with their students. Several professors claim that they do not work exclusively in teaching, having to divide their time between other jobs. [16]

A survey aimed to investigate the perception of teachers about which were the main barriers in the introduction of active methodologies in higher education. Teachers were asked about which points need to be improved to work with more quality in the teaching-

learning process in public universities. Thus, 20% answered the teacher's professionalism as a point to be improved, 20% answered the student's commitment, 20% answered the infrastructure, 30% answered the need for pedagogical planning and 10% did not know how to answer. [19]

The academic performance of students in courses where there was active learning compared to those in passive learning courses (traditional). Their analyzes revealed scores on average 6% higher in active learning course students compared to traditional learning students. In addition, the failure rate of students in traditional classes was 55% higher than that of students in the active methodology. [24]

Most teachers referred as the main strategy used the expository and expository-dialogued class, essentially used by the so-called traditionalist methodologies, totally focused on the content and not on the historical-cultural and social interaction between the subjects of the teaching and learning process. It was noticed that they have attempted to use innovative teaching strategies in their classes, despite having declared a professional training based on traditional education and not having sufficient pedagogical preparation to understand more clearly the elements that involve pedagogical practices and its epistemological bases. [7]

One of the main obstacles faced during the implementation of active methodologies is represented by the resistance of students to be more proactive in their learning. This resistance is generally observed in any approach that is not based on discursive lessons because the active methodologies clearly contrast with the passive listener role that students are used to. [17]

However, there are practical obstacles, as well as obstacles related to the student-teacher binomial, which can limit the use of instructional active learning strategies. Among the practical obstacles are: the limited time available to cover the entire content of the discipline in the classroom, the need for time to develop the strategy before its application, the difficulty of implementing the method in large classes, the teachers' idea about being good speakers themselves and the lack of resources, materials and support equipment. [16]

The most university professors report that they feel ignorance, uncertainty and difficulties in using active methodologies in their teaching practice. In their daily activities, teachers need to think about the educational process to structure it, aiming to provide reflections, skills and actions. This structure is the result of planning, which is directly related to the choice of content, activities, available resources and the methodology to be used. [6]

In contrast, another study shows results that teachers believe they are moving towards a model centered on learning, as teachers believe that the implementation of active methodologies implies new functions in their teaching practice, use assessment systems different from those commonly used. [22]

This conclusion is also highlighted about the students' perception about the usefulness of methodological approaches, which obtained equally positive evaluations for the use of expository methodologies and active learning. Other studies found that students generally had a positive attitude toward active learning, especially when they were told why they were using active techniques. [23]

#### IV. FINAL CONSIDERATIONS

From this review, it was possible to understand about the benefits of using active learning methodologies, as well as the factors involved in the knowledge and actions of higher education teachers.

It is understood that promoting active learning is not an easy task to be achieved and teachers play a fundamental role in its implementation process. The application of active methodologies is not limited to 'experiencing' a differentiated pedagogical activity with students or promoting debates in the classroom. In fact, it means that the effective use of these techniques requires a new philosophical stance from both teacher and student. This posture is essentially different from that observed in traditional classes, which only expect the teacher to "teach" and the students to "learn".

Active learning strategies have been increasingly used in school settings as teachers learn their benefits. Studies have shown that active learning improves understanding and retention of information, and that it is effective in developing high-level cognitive skills such as problem-solving skills and critical thinking.

At the end of a positive active learning experience, students and teachers will benefit from the concepts described in this article. The definition of success in education should not be restricted exclusively to performance appraisals and approval ratings that, in a way, measure the quality of learning in a community, but should also include the meaning of a much broader, more lasting and pleasurable experience, which is portrayed by the real satisfaction in this process, both for the teacher and for the student.

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